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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

There is no structure claimed to define "optical amplifier", "laser", "light emitting diode" or "optical switch" with any specificity define the metes and bounds of claims 22-26 and 40. In claims 27 and 41 "dimensions" is indefinite. What dimensions? Other claims are rejected for dependence on a rejected claim.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-42, as best understood, are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Halas 2002/0187347.

Halas discloses a charge carrier confinement region formed of a first nanoparticle; a barrier of silicon dioxide; and a second metal coating the barrier. Claim 1 is rejected. Claim 2 is rejected as the interior nanoparticle first material may be a semiconductor "core" [0034]. Claim 3 is rejected as one of the "shell" layers over the "core" may be a semiconductor e.g. CdSe [0041]. Claim 4 is rejected as the "barrier" layer over the "core" may comprise a wide bandgap layer such as silicon dioxide [0066]. Claim 5 is rejected as Halas discloses quantum dot structures comprising multiple layers of nanoparticle core /shell/ metal/ shell/ metal. Claims 6-20 are rejected as above considering the multiple shell/ nanoparticle structure of Halas and the terms "semiconductor" or "semi-insulating" are not limiting or distinguishing over the materials disclosed by Halas. Claim 21 is rejected as "approximately" does not distinguish over Halas where the outer barrier is of larger radius than the inner "core". Claim 22 is rejected because Halas is of similar nanoparticle size. Claims 23-26 are rejected as there is no defined structure distinguishing over Halas regardless of the labels "amplifier", "laser", etc.

Claim 27 is rejected as Halas discloses multiple particles, or in the alternative, multiple Halas particles are obvious structures to one of skill.

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Claims 28-42 are rejected as Halas discloses colloidal suspensions of multiple particles and the "method of forming" claims do not distinguish over the "forming" method of Halas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Jackson Jr. whose telephone number is 571-272-1730. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerome Jackson Jr./  
Primary Examiner, Art Unit 2815